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ABSTRACT

In August 1989 the Committee on Automated Reference Service of the New York State Library conducted a use study of their CD-ROM workstations to determine: (1) the extent of user satisfaction resulting from CD-ROM searches at the New York State Library; (2) the ease of using CD-ROM as an information retrieval source; (3) whether training was adequate at CD-ROM stations; and (4) whether CD-ROM products meet user needs. Data were gathered from 77 respondents through a 7-item questionnaire focussed directly on understanding and evaluating the patron's needs and expectations. Although demographic information was not solicited, respondents were expected that patrons would be students, government employees, members of the general public, and library staff. The data were analyzed first by tabulating responses into groups and representing them in graph form; then by summarizing comments and suggestions; and finally, by computing the non-parametric method using the chi-square statistic. It was found that 41% of the respondents were greatly satisfied with their CD-ROM search, 56% found the instructional materials adequate, 63% received adequate training, and 91% will use CD-ROMs in the future. Recommendations include: establishing a CD-ROM help desk; making available command cards to supplement the instructional materials; distributing promotional materials to encourage CD-ROM use; and having more staff on hand to assist users. (A copy of the survey questionnaire and 12 references are included.) (SD)

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USER REACTION TO THE CD-ROM DATABASES
AT THE ELECTRONIC REFERENCE STATION
IN THE NEW YORK STATE LIBRARY

by

Eleanor J. Alger

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ABSTRACT

User reaction to the CD-ROM databases
at the Electronic Reference Station
in the New York State Library

The purposes of this study were (1) to determine the extent of user satisfaction with results from their CD-ROM search at the New York State Library, (2) to determine the ease of use with CD-ROM as an information retrieval source, (3) to determine if training was adequate on the CD-ROM stations, and (4) to determine if CD-ROM products currently available meet user needs.

Data was gathered during the month of August 1989 by means of a seven item questionnaire. Six of the items required the respondents to answer by checking appropriate boxes and the other item allowed a free response.

Responses to selected questions were weighed using a Likert scale to score responses from questions two through five:

1. User satisfaction: the extent to which users were satisfied with their search based on CD-ROM information retrieval.
2. Training: the extent to which users felt they received adequate training.
3. Material adequacy: the extent to which CD-ROM products available were relevant, useful, and current.

4. Future use: the extent to which the user would plan to use CD-ROM products for information retrieval in the future.

The questionnaire did not solicit any personal data because of the personal ethics factor.

Usable questionnaires were obtained from seventy-seven respondents. The data was analyzed in three ways. First, responses to each question were tabulated into groups and were represented in graph form. Second, comments and suggestions were summarized separately in the "notes" section. Finally, the non-parametric method using the chi-square statistic was computed to determine if a relationship existed.

Based on the results, at a ninety-five percent confidence level, the null hypothesis was rejected. It was determined that only forty-one percent of the respondents were satisfied with their CD-ROM search.

The greatest number of suggestions and comments stated that the CD-ROM was a superior searching tool. Many thought that it was necessary for the Library to keep up with technology. A lesser number of suggestions and comments were directed toward the difficulties of machine error messages, printing difficulties, and lack of knowledge regarding the general public's use of the CD-ROM stations.

Forty-one percent of the sample of respondents were very satisfied with their CD-ROM search, sixty-three percent received adequate training, fifty-six percent of respondents

found their CD-ROM material adequate, and an overwhelming ninety-one percent of respondents said yes, they would use CD-ROM's in the future.

INTRODUCTION

The New York State Library, established in 1818, is among the top one hundred research libraries in the nation and the largest state library. It is the only state library with a membership in the Association of Research Libraries.

The New York State Library supports the state government by providing research and reference service to state agencies and legislative staff. The Library is a modern research library integrating new technology into its vast resources. The Electronic Reference Station, located on the public floor of the State Library has a variety of computerized databases on CD-ROM disks. Library reference staff can respond quickly to patrons' questions as well as verify citations.

Optical publishing has provided one more technological development that brings the user closer to the information. The CD-ROM is an integral part of digital optical products which are leading the way in information technology. Large amounts of information data can be stored on CD-ROM disks. One CD-ROM can store approximately 270,000 single-space typewritten pages or 1,500 to 1,600 floppy disks. The CD-ROM is approximately 4.75 inches in diameter. Due to the advancement of personal computers, this has allowed students to have access to vast amounts of data that previously was only available on mainframe/vendor search systems such as BRS and DIALOG.

This form of Optical Disc Technology records information using analog and digital methods. Data on CD-ROM's can be comprised of an assimilation of graphics, text, and/or audio. Due to the permanently stored information of the CD-ROM, access is quick and extremely accurate. Other advantages to a library with CD-ROM access are the very large capacity, standardization, and ease of retrieval of data. Some disadvantages are the initial investments of hardware, cataloging, and/or obsolete or non-current data.

For the user (patron, librarian, etc.), CD-ROM databases offer enhanced searching of periodical indexes. When accessed by the users, the CD-ROM's serve in the retrieval of information.

Based on many libraries' experiences, an extensive training program for both staff and patrons should be implemented. It has been proven that placing a CD-ROM system in a reference area requires a large amount of staff time giving one-to-one instruction. Libraries are discovering that they need combined group instruction with point-of-use instruction.

Due to the advances in reference technology and compact disc technology, the New York State Library has developed its own electronic reference station. This electronic reference station is where a variety of electronic reference tools can be used. The Electronic Reference Station (ERS) consists of eight CD-ROM products. The eight CD-ROM

packages available at the New York State Library's ERS as of August 1989 are the following:

Business Periodical Index (1983+) --- this CD-ROM subject matter covers all aspects of business from management, production and marketing to activities of specific business and trade. Feature articles are indexed, as are biographies, product reviews, obituaries, statistics, association reports and book reviews.

CASSIS Bibliographic Information Files (1836+) by the U.S. Patent and Trademark Office --- this CD-ROM product covers patent searching from 1836 to the present. The subscription rate is three hundred dollars a year with bimonthly updates. There are five files on two CD-ROM's.

Corporate and Industry Research Reports (1979+) --- this CD-ROM product provides access to research reports published by major Wall Street and international securities and investment firms from 1979 to the present. Those reports contain business, political, and social science information. Abstracts provide information on market share, management strategy, financial ratios, sales figures and company/industry performance.

Educational Resource Index (1966+) --- this CD-ROM product provides access to journal articles, technical reports, books, and research reports on education and its related fields.

Government Publications (1976+) --- this CD-ROM product provides access to U.S. government documents indexed by the Government Printing Office.

Index to Legal Periodicals (1981+) --- this CD-ROM product provides citations to articles in over four hundred periodicals which cover matters relating to all areas of jurisprudence.

National Technical Information Service (1985+) --- this CD-ROM product contains scientific, technical, and engineering information from the U.S. government from 1985 to the present. It contains citations with abstracts to these government reports.

Medline (1983+) --- this CD-ROM product contains the National Library of Medicine's bibliographic database. Citations to more than 3,200 biomedical journals of interest to health professionals are provided.

The Electronic Reference Station (ERS) is located in a public area of the New York State Library making it an ideal location to monitor user patterns such as time use, subject

interest, frequency of use, training needs, patron profiles, and user satisfaction. Since the New York State Library must continue to use the new reference technology and take a leadership role in this technology's evaluation and use, my study is a response to this need.

This study was based on a request for information from the Committee on Automated Reference Service (CARS) of the New York State Library. Based on the results from this study, it will focus on CD-ROM technology and user reaction, existing services, and recommendations to be used in future planning.

RESEARCH PURPOSE

The State Library has eight CD-ROM products in the ERS for use by patrons and staff. These products were introduced over the last year. Emphasis was placed on subscribing to products which indexed major collections of the library. There are print and online equivalents for most of the CD-ROM databases.

The purpose of this study is to evaluate user reaction to CD-ROM technology and its acceptance as a reference source. Opinions of the library users concerning the different products as well as comparisons of the various databases were also sought.

Another objective of this study was to produce information on the particular characteristics of the CD-ROM databases that cause user satisfaction or user dissatisfaction with a particular database. The positive variables used to measure a patron's positive response were satisfaction and success. Satisfaction measured a user's success in gaining information sought in a particular CD-ROM database; success was measured by the amount of relevant citations that were retrieved.

The negative variables used to measure a patron's dissatisfaction were the comment section and Lickert scale of the questionnaire.

REVIEW OF LITERATURE

Several articles and studies of user reactions to CD-ROM's have been conducted from winter 1987 through the fall of 1989. Some of the limitations of these articles to be taken into account are future developments in hardware compatibility, audio, graphic and motion capabilities. A mid-1989 study conducted by LePoer and Mularski found CD-ROM's common in academic libraries. The Ohio State University Library has a varied user group which encompasses undergraduates, professionals, and the general public. First results of the new service of CD-ROM's MEDLINE database system was minimal and no restrictions were placed on patrons. Over a four month period enough word-of-mouth had drawn in enough users to force the library to institute use of sign-up sheets, time limitations, and new rules. By January 1988 a second searching station was purchased.¹ The average CD-ROM usage for July to December 1987 was eight users per day (maximum seventeen), and the average for January to May 1988 was seventeen (maximum forty-three).² Of survey respondents, sixty-four percent were students, thirty-three percent were faculty and staff, and three percent were others. A majority of the respondents (forty percent) said that they had learned how to use MEDLINE on CD-ROM system mainly through one-on-one instruction by a library staff member. Others (twenty-eight percent) educated themselves by using the in-house manual, fifteen

percent figured out the system through trial and error, and only eight percent found the screen instructions to be most effective.³ With searching precision and problems encountered, thirteen percent indicated that all citations were useful, forty-six percent were satisfied with three citations out of four, twenty-two percent found half the citations relevant and twenty percent found only one in four useful.⁴ Librarian-produced searches usually do not have one hundred percent precision either. Ninety-one percent of patrons reported using CD-ROM because it is convenient, eighty percent felt it yields quick results, and seventy-seven percent liked it because it was free of charge. Forty-nine percent of the users found CD-ROM useful for their faculty or graduate research projects, forty-six percent used it to help fulfill class assignments, and twenty-five percent used it to obtain patient care information. Thirty-one percent of the respondents indicated that they enjoyed searching the system.⁵

A late 1988 study conducted by Hudson discusses several common themes such as costs of technology, the importance of hardware and software technology, and widespread acceptance. A consequence of having a CD-ROM index to periodicals was the necessity to subscribe to a number of periodicals not previously held because of increased demand for titles. Librarians should recognize that CD-ROM products are very expensive if they are used to duplicate, rather than replicate, printed resources.⁶ CD-ROM versions of some

indexes are much easier to use than their printed counterparts. The use of a library's own collection and/or interlibrary loan will increase dramatically as a result of easier access to citations.

Littlejohn and Parker conducted a study with librarians at California State University which focused on compact disc technology because of its availability and storage capacity.⁷ To begin the evaluation several questions were explored: Was there a need to replace, supplement or add to current library sources available in print or through online computer systems? What determines if particular products should be selected? How to choose among products available from several companies? The value of knowledge, in this study was determined and depends on the degree of "fit" between the knowledge available and the information environment within which users operate and wherein they must make decisions.⁸ Which print indexes or online computer databases are heavily used? It was found, in particular that as increasing number of students become computer literate, this skill can be applied to research and manipulation of data. A log was developed to record frequency and length of use by individual product. Librarians had a desire to experiment with new technology and stay abreast with developments in academic libraries.

The Jean and Alexander Heard Library of Vanderbilt University was involved in an automation effort whose primary goal was to provide the academic community

electronic access to information resources beyond the online catalog. CD-ROM technology developed concurrent with this study and with two of the project's stated objectives: (1) to experiment with new and alternative technological developments related to article level indices and full-text storage; and (2) to determine user success with preferences for and institutional costs of different formats, different user interfaces and different coverages.⁹ Throughout the project, reactions from users have been elicited through various surveys and through personal contact with the users. October was selected as the month to be surveyed because it fell in the middle of the semester and contained no holiday breaks. An uninterrupted span of four weeks was used for the survey. All end-users of the CD-ROM workstations were approached to participate in the study. Surveys were conducted from 8:00 a.m. until 5:00 p.m. every weekday and each library was surveyed at least four week nights from 6:00 p.m. to 10:00 p.m. Eight hundred twenty-five forms were handed out and six hundred eleven were returned, resulting in a seventy-four percent return rate. The study's results indicated over forty-eight percent of people surveyed indicated they had at least some experience with CD-ROM's, thirty-eight percent use computers regularly and nine percent claimed no computer experience.¹⁰ Experience proved a factor in how well patrons perceived the usefulness and ease of use of the CD-ROM's they were using. As would be expected, those with less experience found the systems

more difficult to use than those with a great deal of computer experience.¹¹ The researchers were glad to know that the patrons were using many research tools available in the library and that they see the CD-ROM as merely one of the options available. Findings indicated that those more familiar with computers generally preferred the CD-ROM's over printed indexes.¹² They saw the advantages that a computer can offer. Seventy-two percent, the overwhelming majority, learned to use the CD-ROM system by the library staff, twenty percent learned by trial and error, and eighteen percent learned by using the online help screens.¹³ Perhaps the most subjective measurement on the survey, is that it did indicate that slightly more than sixteen percent felt that they would have spent fifteen minutes or less on their search even if they didn't have a CD-ROM available, twelve percent felt they would have spent one to two hours, and over four percent said three to four hours.¹⁴ As more and more library users have become aware of these products and familiarized themselves with them, CD-ROM's have become as essential a tool for research as an online catalog. This survey has enabled changes to be addressed based on what the users indicated was helpful or a hindrance.

A 1989 study conducted by Joanne Marshall at the University of Toronto found there was a positive relationship between the number of training events reported and the implementation level.¹⁵ Variability in the

implementation levels of the respondents suggests end users are a diverse group with different information needs and degrees of searching expertise. The survey showed that various types of both formal and informal training will continue to be required by end users.

Vendors of online and the newer CD-ROM products are attempting to enlarge the market for electronic information services by encouraging health professionals to search these databases directly. An end user is defined as the person with the information need. End user searching is database searching performed by the person who actually needs the information rather than by a librarian or other search intermediary.¹⁶ Forty percent of the end users surveyed reported having taken a course or workshop. A matter of concern was that since considerable resources are put into the development of online help systems, they would be wasted if the help is not used. This study viewed one of the purposes of online searching as saving time. Many users expressed surprise and discouragement at the time it took to become familiar with the online search process. The problem with end user searching of online databases, even if there was a formal training program, is that after initial use most patrons stop using it. Once they stop, they forget commands and techniques, and it becomes even harder to use plus the "money clock" keeps running. CD-ROM end users have not had the same experience, I believe, because of the fact of "no costs" involved and these end users feel more

comfortable with spending longer amounts of time learning and using the system. A problem with end user searching as well as some other so-called intellectual technologies, is that initial interest and use does not guarantee continuing use.¹⁷ Several implications from this study pointed towards future end user training efforts. Librarians should remain attuned to the difference among end users and resist the temptation to think of end users as a single homogeneous group. Informal demonstrations and discussions with end users are often the next teachable methods. Librarians have instinctively done this kind of informal teaching for a long time without any special recognition. However, this study gives support to its importance as a component of the total training effort. The results also indicated that there are end users who can get along quite well without formal training opportunities as long as there was adequate assistance from reference staff, printed materials, and/or help screens.

Bruce Connolly conducted a study on information delivery with a WILSONDISC reference workstation using the CD-ROM. WILSONDISC databases cover the disciplines in which most public school and academic library users are interested, and in some fields, they provide the intensive coverage that special and university libraries need to offer. WILSONDISC combines two primary purposes to provide database access to trained and untrained searchers via a search system that accommodates varying levels of ability,

and provides an integrated hybrid system that complements local access to the optically stored information in its databases with online updating.¹⁸ Of all the WILSONDISC search modes, Browse was the one most actively used by students and probably by the library staff, too. Although the only access into a database is through the controlled vocabulary, there is a school of thought that holds that a searcher who enters a term that is not a designated subject-heading should be automatically introduced by the system to the correct heading. This feature is in the WILSONDISC WILSEARCH mode. WILSONDISC is seen as being a system of interlocking strengths. Users can choose the mode they want to search in for its best attributes and opt for some other level whenever it suits their needs.¹⁹

Administrative concerns were originally thought to have some trade-offs between conventional reference service and providing assistance with the CD-ROM service. In the Union College Library where this study was conducted, the online searching staff and the reference desk staff overlap almost completely and the new and added demands of CD-ROM related reference work represented no particular problem.²⁰ Other data available from the study showed that once WILSONDISC was in place for the start of the 1987/88 fall term, the number of online searches dropped nearly fifty percent and net search expenditures fell below one thousand dollars, resulting in a seventy-three percent decline.

Almost all institutions that charged for computer

database searching have experienced a similar reduction in requests. However, special libraries where searches are often free have experienced no decline and often see the number of requests increase especially for more complicated requests that are still difficult to do on a CD-ROM system.

A 1988 study conducted by Bill Coons and Linda Stewart documents the healthy integration of CD-ROM's into the selection, technical processing, and access of information resources in the Cornell library. All were relevant and useful information resources integrated into Cornell's fifteen on-campus libraries, regardless of medium. Selecting CD-ROM's involves matching what patrons want with what is appropriate for the library as well as what the library can afford and support. Cornell treated CD-ROM material like other library acquisitions to determine if existing CD-ROM products fell within the library's scope. The following questions were analyzed to determine whether CD-ROM's were appropriate: Is the price reasonable? Is the producer reliable and helpful? Does the product have a bibliographic database? And is the software easy to use?²¹ Because of the relatively high prices of CD-ROM products, it is Cornell's desire to provide effective support for their use by the public by being more exact in the CD-ROM selection than is used in determining what printed material to purchase. CD-ROM's are assigned both call numbers and subject headings. An added benefit of CD-ROM use is that it prevents data corruption by the user.

In addition, running the search software on a hard disk serves to protect the users without a great deal of computer knowledge.²² The CD-ROM products in the Cornell system have predetermined goals set for their use: (1) they are available to anyone; (2) they are to be treated as much as possible like the printed indexes or statistical reference works they resemble; (3) they are to provide a free self-service alternative to the current online service; and (4) they provide an opportunity to teach users about the organization and retrieval of information.²³ The reference staff is responsible for the CD-ROM's. Logic dictated placing the workstations within eye contact of the reference desk and making reference staff responsible for user assistance. Since the products are so often in use, Cornell has a sign-up sheet so that anyone may reserve a CD-ROM for up to two consecutive hours during a given day. There is no need to limit printing as yet. Adding CD-ROM's to reference service has had a noticeable effect on other services available to the users. CD-ROM's had generated a positive feeling among users and by extension the staff.²⁴

The addition of CD-ROM products to reference service has had an impact on services other than answering reference questions. There are faculty requests to borrow copies of the CD-ROM's to be used in their departments. A totally unforeseen development has been the need for additional staff time to file hundreds of ERIC microfiche, which were never used in such quantity before.²⁵ Cornell felt there

were many reasons for teaching their users about CD-ROM. Chief among them is the fact that they provide a handy means for teaching the concepts of their information literacy curriculum. CD-ROM products are not totally self-explanatory for most users. CD-ROM presents itself as an opportunity to describe more familiar resources to students.²⁶ The CD-ROM complements but does not replace existing resources. The information environment in which users operate is increasingly becoming an electronic one. It only seems logical that users should have the opportunity to learn about applications and benefits associated with the CD-ROM.

Students using the CD-ROM needed less time to find each relevant reference, even though most of them were using the database for the first time. In addition, students given a half hour instructional session in the use of CD-ROM performed better than uninstructed students, although all were permitted to ask library staff for help.²⁷ This study concluded that CD-ROM's have been positive and encouraging and that the benefits have outweighed the costs. CD-ROM's are very popular with the users. Cornell has also realized that everyone on staff needed to learn more about CD-ROM than was originally thought. Formalized in-depth training for their reference desk, information personnel and librarians were then being planned.

A study by William Paisley and Matilda Butler found that CD-ROM represents a fourth revolution in publishing

that creates dramatic new opportunities for distributing information. The computer can store past information with many access points provided by computer generated indexes. Users were able to retrieve the "momentarily important item." The early converts to online database searching were researchers. Since they were already heavy users of print information, the speed and retrieval power of online systems justified the higher cost. The first stand alone databases were introduced on diskettes by 1983.²⁸ To publishers, CD-ROM's half billion character capacity represented the best of publishing opportunities. As many as 200,000 pages or three hundred books per disk were indexed for retrieval of every significant word. The growth that online systems achieved in twenty years will probably be matched by the growth of the optical disc industry in less than ten years.²⁹ CD-ROM products are created from both online databases and print collections. The latter source is relatively inexhaustible. A hundred or more CD-ROM applications were announced by the second quarter of 1987. These ranged from the Bible to compilations of maps. Like earlier technologies, CD-ROM leaves the laboratory as a solution in search of problems to solve. At first, the rôle of the CD-ROM will be to replace other information dissemination technologies that it outperforms in cost or functionality. Later, it will perform new functions that in some cases will be unforeseen consequences of its unique characteristics. It is these new functions, more than the

replacement functions, that will make CD-ROM as indispensable in our lives as the television, airplane, or telephone.³⁰

CD-ROM as a replacement for printed information represents a new cost for offices and libraries that is recoverable only as the discs become less expensive than the printed information they replace. Presently, CD-ROM is more expensive than printed information and it will remain so until the economies scale begins to operate in its favor.

In a later study, William Paisley and Matilda Butler studied the new development with the CD-ROM's not addressed in their first study. Because CD-ROM products had been introduced to replace online, microform and/or print information, they cost less to use than online, are more convenient to use than microform, and retrieve information more precisely than print. CD-ROM represents the historic separation of computer readable mass storage from online charges. Although CD-ROM discs are not yet inexpensive, most are priced in the range of ten to twenty hours of equivalent online time.³¹

CD-ROM application developers have learned to watch behavior and develop a technology that seeks and finds its own level in relation to older technologies with overlapping capabilities. To be cost effective, a technology will be required to perform in less powerful as well as more powerful functions.

CD-ROM will be an adopted technology at first in

offices and libraries, followed by schools and other institutional settings and finally homes. It will be required to perform the less powerful reference functions as well as the more powerful problem solving and decision support functions. Even if it is used primarily as a reference tool, the image of what it can do "at its own level" will be an important factor in its adoption.³²

CD-ROM's greatest present limitation is the cost of updating and reissuing discs to stay abreast of new information. The more rapidly a disc must be updated, the more it costs the information producer. The more frequently it must be issued, the more it costs the information user. Currently the CD-ROM cannot keep pace with online systems in reporting certain types of information. Many databases are updated daily with changes that a user can do without for a month or longer. CD-ROM's cannot be used for information that changes rapidly and is needed on an urgent basis. CD-ROM's may be the future medium of choice for information that changes slowly or is not urgently needed.

The CD-ROM system is a gateway to one or more online systems.

SPECIFIC HYPOTHESES

- H₀ Users are very satisfied with results from the CD-ROM search.
- H₁ CD-ROM is easy to use.
- H₂ CD-ROM training is easily accessible to patrons.
- H₃ CD-ROM products available to patrons are current to patron needs.

The null hypothesis is that users are satisfied with results they obtained from CD-ROM searching. Satisfaction is the measure of the user's overall searching on the CD-ROM databases.

The first hypothesis is that CD-ROM has ease of use for the patrons. Ease is defined as understandable, instructive use of the CD-ROM with understandable and relevant information obtained from this source.

The second hypothesis is that CD-ROM training is easily accessible to patrons. This training is administered through reference librarians and procedure manuals.

The third hypothesis is that CD-ROM products available to patrons serve current patron needs because the optical technology in today's library environment enhances the degree where a librarian or a user can obtain accessed information from their query almost immediately. This is an advantage when using a searching tool.

RESEARCH PROCEDURE

In 1989, the Committee on Automated Reference Service (CARS) of the New York State Library conducted a study of the effects and use of their eight CD-ROM's. These CD-ROM's were located at the Electronic Reference Station on the seventh floor of the New York State Library. (See Appendix C) The CARS committee chose to focus on what CD-ROM's had frequent use and the degree to which the user was satisfied with the CD-ROM search. Also, the CARS committee was interested in whether the instructional material was satisfactory, if the librarians provided adequate training for the user, and, most importantly, if the patron would use the CD-ROM products again. The results of this study will help determine if the user's needs are met, preferably with the use of CD-ROM over other sources, if CD-ROM is easy for the patron to use, and if CD-ROM training is adequate and provided by reference librarians. Available at the New York State Library are print and online equivalents for most of the CD-ROM databases as the alternate sources of information searching. The results of the study will be addressed in four sections: (1) the instrument used in collecting data; (2) the sample design and survey; (3) analysis of data, statistics; and (4) limitations.

Definitions

Satisfaction: the measure of the user's overall response to obtaining data from their search using CD-ROM's.

Ease: the understandable, unobtrusive use of the CD-ROM databases enabling the user to get information.

Likert scale: a type of scaling where the respondents are presented with a series of statements rather than questions, and asked to indicate the degree to which they agree or disagree, usually on a five point scale.

Patron or user: a person seeking or searching information on a topic.

CARS committee: Committee on Automated Reference Service.

ERS: Electronic Reference Station, which is comprised of eight CD-ROM stations (see Appendix C for pictorial representation).

The Instrument

A seven question questionnaire (see Appendix A) was designed specifically for the CARS committee study. The questionnaire was used to focus directly on understanding and evaluating the patrons's needs and expectations. A patron is defined as a person seeking information on a topic. This person may be a student, legislative, governmental, and/or state agency employee, general public or other library staff member. (These people will be referred to as "the patron" throughout the remainder of this paper.)

The questionnaire was issued to patrons during a two week time period, during the month of August 1989. Within

this two week time period, questionnaires were made available to the patron via red boxes with instructional signs posted. The instructional signs provided each patron an option to fill out the questionnaire on site, privately or gave the option to fill out at another time. The instructional sign asked the patron to evaluate the CD-ROM products used by that particular patron. The instructional sign told patrons that based on their evaluation, CD-ROM purchases or maintenance of existing CD-ROM's would be evaluated. The patron was assured that service to the patron was most important to the survey. Completed surveys were collected daily from the evaluation boxes provided on site. The collection time was 5:00 p.m., daily, Monday through Friday for those two weeks.

Seven relevant questions were asked of the patron to aid our understanding of the CD-ROM's available. Questions asked were the following: Which CD-ROM products were used? How easy was the product to use? Was the instructional materials adequate? Did the patron feel that she/he received adequate training from a librarian? Was the patron satisfied with the results of the search? Did the patron plan to use the product again? Also provided was a comment section to allow the patron to address a topic of concern that was not asked on the questionnaire. This was intended to gain insight into problems or progress not addressed by the researcher.

The Sample Design

A sample of respondents over a two week period conducted at the New York State Library was selected to represent the CD-ROM patron.

The use of questionnaires provided this study a dual benefit for this research. The first was a self-report and the second was the availability of data from a diverse group. Self-reporting via questionnaire is a direct way to obtain evidence of attitudes, feelings, a retrospective recall of early technological feelings and where they have led us in today's library. The five point Lickert scale was used to rank responses.

The data for this study was conducted for a period of two weeks during the month of August 1989 at the New York State Library. The questionnaires were made available at the Electronic Reference Station to all patrons from Monday to Friday, 9:00 a.m. to 5:00 p.m. during the study. The questionnaires were made available to each patron at each CD-ROM work station. The survey was conducted in this way to provide anonymity to all patrons ranging from general public to legislative staff.

Questionnaires were placed at CD-ROM workstations on the desk next to the micro-computers on the seventh floor of the New York State Library, where CD-ROM applications are used daily. Completed responses were collected in evaluations boxes. These boxes had signs saying "Place evaluation forms here." These collection sites were retrieved and collated throughout the day. Each day's data was kept separate by day.

The final sample (N=77) represented which CD-ROM products were used as follows: BPI (Business Periodicals Index) eighteen percent; CASSIS (U.S. Patent Index) eight percent; CIRR (Corporate and Industry Research Reports) six percent; ERIC (Education Resources) thirteen percent; GPO (Government Publications) twenty-one percent; ILP (Index to Legal Periodicals) twelve percent; NTIS (National Technical Information Services) seventeen percent; and MED (MEDLINE) five percent (see Table 2). The sample of respondents (N=77) satisfied with their CD-ROM search: forty-one percent were very satisfied; twenty-seven percent were somewhat satisfied; eighteen percent had no responses; seven percent were somewhat dissatisfied; and seven percent found their search very difficult (see Table 3). Patrons responding to training found sixty-three percent received adequate training, twenty-four percent did not receive adequate training, and thirteen percent did not respond (see Table 4). Fifty-six percent of respondents found their CD-ROM material adequate, twenty-two did not find the material adequate, and twenty-two percent did not respond (see Table 5). Respondents were asked if they planned to use the CD-ROM products repeatedly: ninety-one percent said yes, one percent said no, and eight percent did not respond (see Table 6). If terms of ease of use with specific CD-ROM products, the following results were obtained: BPI forty-two percent found CD-ROM use very easy and fifty-eight percent found use somewhat easy (see Table 7); CASSIS fifty

percent found use very easy, thirty-three percent found use somewhat easy and seventeen percent did not find it easy or difficult (see Table 8); CIRR twenty percent found use very easy, forty percent found use somewhat easy, twenty percent had no feelings either way, and twenty percent found use very difficult (see Table 9); ERIC forty-four percent found use very easy, thirty-three percent found use somewhat easy, and twenty-three percent had no feelings either way (see Table 10); GPO sixty percent found use very easy, thirty-three percent found use somewhat easy, and seven percent had no feelings (see Table 11); ILP thirty-three percent found use very easy, fifty-six percent found use somewhat easy, eleven percent had no feelings (see Table 12); NTIS nine percent found very easy, thirty-six percent found use somewhat easy, fifty-five percent had no feelings (see Table 13); and MEDLINE twenty-nine percent found use very easy, twenty-nine percent found use somewhat easy, forty-two percent had no feelings (see Table 14).

Statistical Analysis of CD-ROM Evaluation

Data sampled at random must be classified against three levels of measurement before it can be properly analyzed according to statistics for this study. The three levels of measurement are the following:

1. Nominal - data with values that can only be categorized (i.e., frequencies).
2. Ordinal - data that can additionally and meaningfully be ranked from highest to lowest

value.

3. Interval - data that in addition to the first two requirements can also be scored (i.e., school test results).

The data assembled for this CD-ROM evaluation clearly can be classified as nominal data because the data involves frequency values only. It is meaningless to rank one CD-ROM product above or below another and there is no score value for any of the products. The data is strictly limited to the frequency of use of each product.

Since nominal data is the most basic and least sophisticated type of data, the methods for statistically analyzing it are narrowed down considerably and therefore are limited. The two statistics that will be determined from the data are its central tendency and its fit against the null hypothesis.

Central Tendency

The central tendency or "average" of the CD-ROM evaluation can be described by only one meaningful value at the nominal level. Whereas the ordinal and interval levels have the median and mean methods, respectively, to describe the "average" of their data, nominal data has only the mode to identify its central tendency. The mode may be found by simple visual inspection of the data: it is simply the value of the most frequently used CD-ROM product in the data. In this evaluation, the "average" is sixteen or GPO is the product most frequently used.

Null Hypothesis

Given that the data in this evaluation is nominal, it cannot be analyzed statistically by parametric methods. These methods require a normal distribution of data (i.e., a bell curve) and the data in this evaluation does not fit that distribution.

The data, therefore, will be analyzed using non-parametric methods, and the method chosen will be the chi-square statistic which measures the data against the null hypothesis.

The null hypothesis states that the data sampled in this study is simply that as would be expected from chance alone. The chi-square statistic attempts to prove that the data is significantly different from that as would be expected from the laws of chance. The formula for chi-square is the following:

$$x^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

where: f_o = the observed frequency

f_e = the expected frequency

x^2 = the computed chi-square statistic

$$f_e = \sum f_o = \frac{14 + 6 + 5 + 10 + 16 + 9 + 13 + 4}{8} = 9.23$$

$$\begin{aligned} x^2 &= \frac{(14 - 9.63)^2}{9.63} + \frac{(6 - 9.63)^2}{9.63} + \frac{(5 - 9.63)^2}{9.63} + \\ &\quad \frac{(10 - 9.63)^2}{9.63} + \frac{(16 - 9.63)^2}{9.63} + \frac{(9 - 9.63)^2}{9.63} + \\ &\quad \frac{(13 - 9.63)^2}{9.63} + \frac{(4 - 9.63)^2}{9.63} \\ &= \frac{(4.37)^2}{9.63} + \frac{(-3.63)^2}{9.63} + \frac{(-4.63)^2}{9.63} + \frac{(0.37)^2}{9.63} + \frac{(6.37)^2}{9.63} + \\ &\quad \frac{(-0.63)^2}{9.63} + \frac{(3.37)^2}{9.63} + \frac{(-5.63)^2}{9.63} \\ &= \frac{19.10}{9.63} + \frac{13.18}{9.63} + \frac{21.44}{9.63} + \frac{0.14}{9.63} + \frac{40.58}{9.63} + \frac{0.40}{9.63} + \\ &\quad \frac{11.36}{9.63} + \frac{31.70}{9.63} \\ &= 1.98 + 1.37 + 2.23 + 0.01 + 4.21 + 0.04 + 1.18 + 3.29 \\ x^2 &= 14.32 \end{aligned}$$

degrees of freedom:

$$df = n + 1 = 8 - 1 = 7$$

from statistical tables:

$$x^2_{0,05,5} = 14.067$$

with Yates correction factor:

$$x^2 = 14.53$$

The null hypothesis, therefore, is rejected since the computed x^2 is greater than x^2 given in the tables. Therefore, that with a ninety-five percent degree of certainty (pL.05) the central tendency of "average" of sixteen for the GPO (Government Publications) is not due to chance. Therefore, it is statistically significant at the .05 level.

This correlates directly to Table 3. In Table 3, the findings indicated that in the population of respondents (N=77), forty-one percent were very satisfied with their CD-ROM search, twenty-seven percent were somewhat satisfied, eighteen percent did not respond, seven percent were somewhat dissatisfied, and seven percent found their search very difficult.

The Lotus Freelance Plus program was used to develop all the charts (see Tables 1-14). This Lotus graphics generating software package automatically plots various types of graphs based on data input. The numeric data input is then transcribed to graph format. In the case of this study, the data input was the responses to the questionnaire. Actual charts were labeled sequentially (i.e., 1, 2, 3...). In this study it was decided to utilize bar graphs. The labeling is very easy to interpret in bar format. Any specific types of response that is deemed suitable for further research can be easily obtained for the tables.

Limitations

In this study, the questionnaire that was developed as the method to gather and analyze data offered opportunities for respondents to express their opinions in an informal manner. However, this study does have limitations that should be mentioned. The questionnaire as an information gathering tool may have provided respondents an avenue to position themselves in a more competent position and answer in more socially expected or desired way for the New York State Library's research project. Questionnaires have high generalizability but tend to give up precision at times. Specifically, precision of control over variables that were not being studied. The questionnaire was unobtrusive, therefore, no personal data was requested. Separation of gender was not asked of the participants. There were no age group categories presented, as the intensive issues in this study centered around user satisfaction with CD-ROM's, ease of use, training, repeated use, and appropriateness of the New York State Library's CD-ROM reserves. The questionnaire was circulated for only two weeks, in August 1989. Several sampling patrons under the student population, government, or legislature may not be fully represented in this study to the extent they would have if school or the legislature was in session. The study was conducted Monday through Friday. No weekend user information was obtained for this study sample.

All methods have limitations, hence any one set of results is limited. Results depend on methods. The

questionnaire method used for this study has construct as well as external validity. The statistical relationship draws precision into the relationships presented (see hypotheses).

RESULTS

The data collected from the survey have been evaluated using bar graphs. Several questions were asked of the questionnaire respondents to test the stated hypotheses (see Tables 1-14). The tables describe the data obtained from the questionnaire. Data is in graphical representation.

TABLE 1: SUMMARY OF CD-ROM'S TESTED, part 1

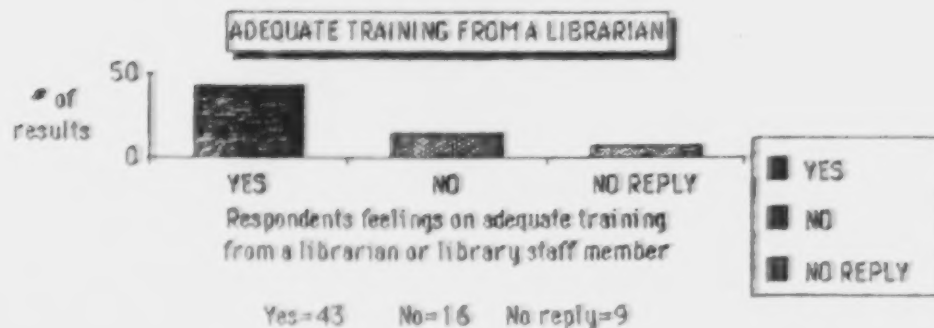
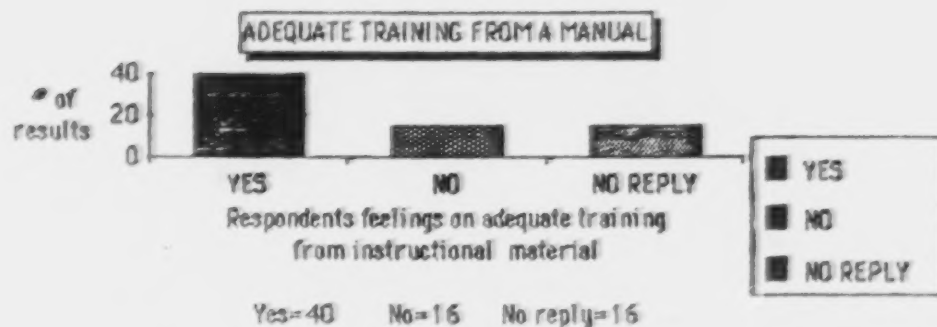
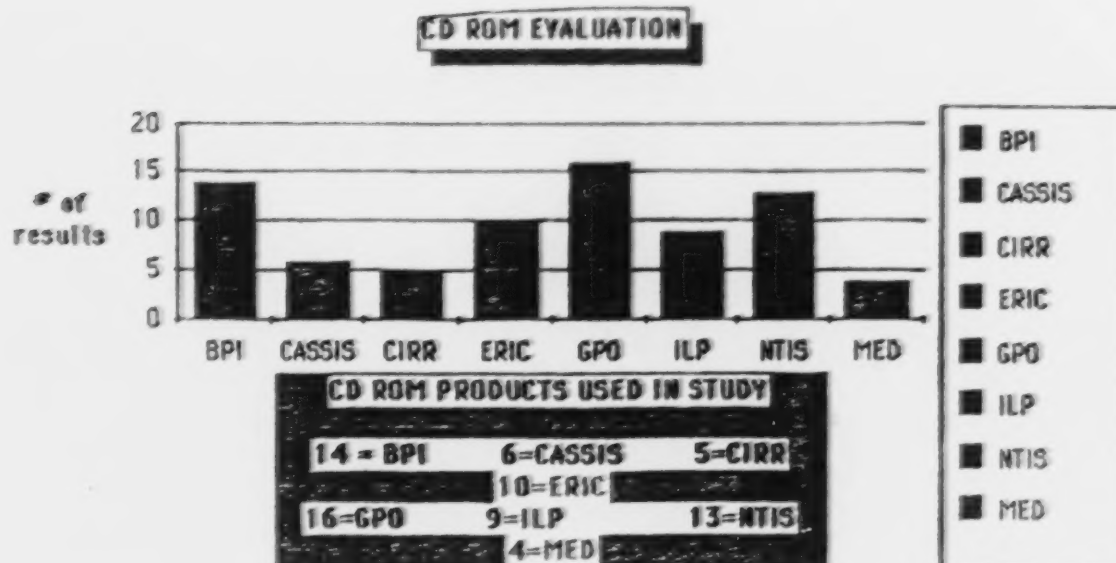
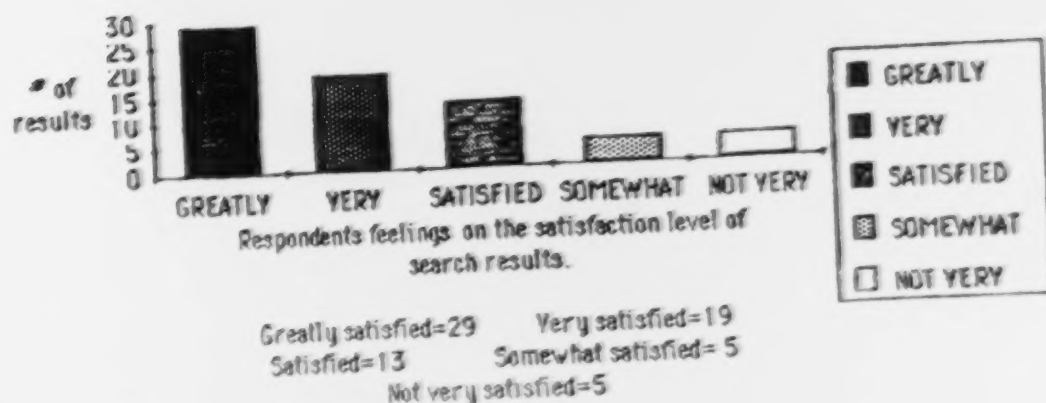
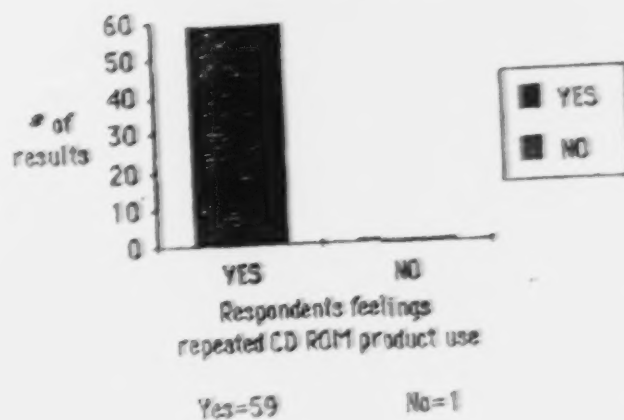


TABLE 1: SUMMARY OF CD-ROM'S TESTED part 2

SATISFACTION WITH SEARCH RESULTS FROM THE CD-ROM



FUTURE CD ROM PRODUCT USE



CD-ROM PRODUCTS CHOSEN

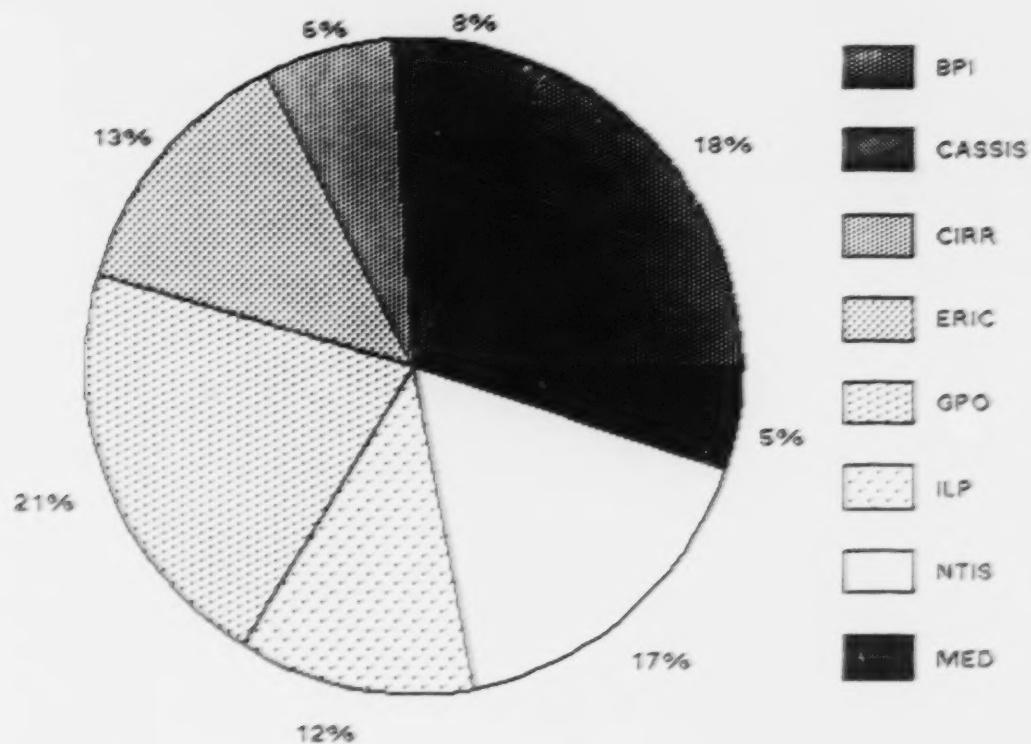
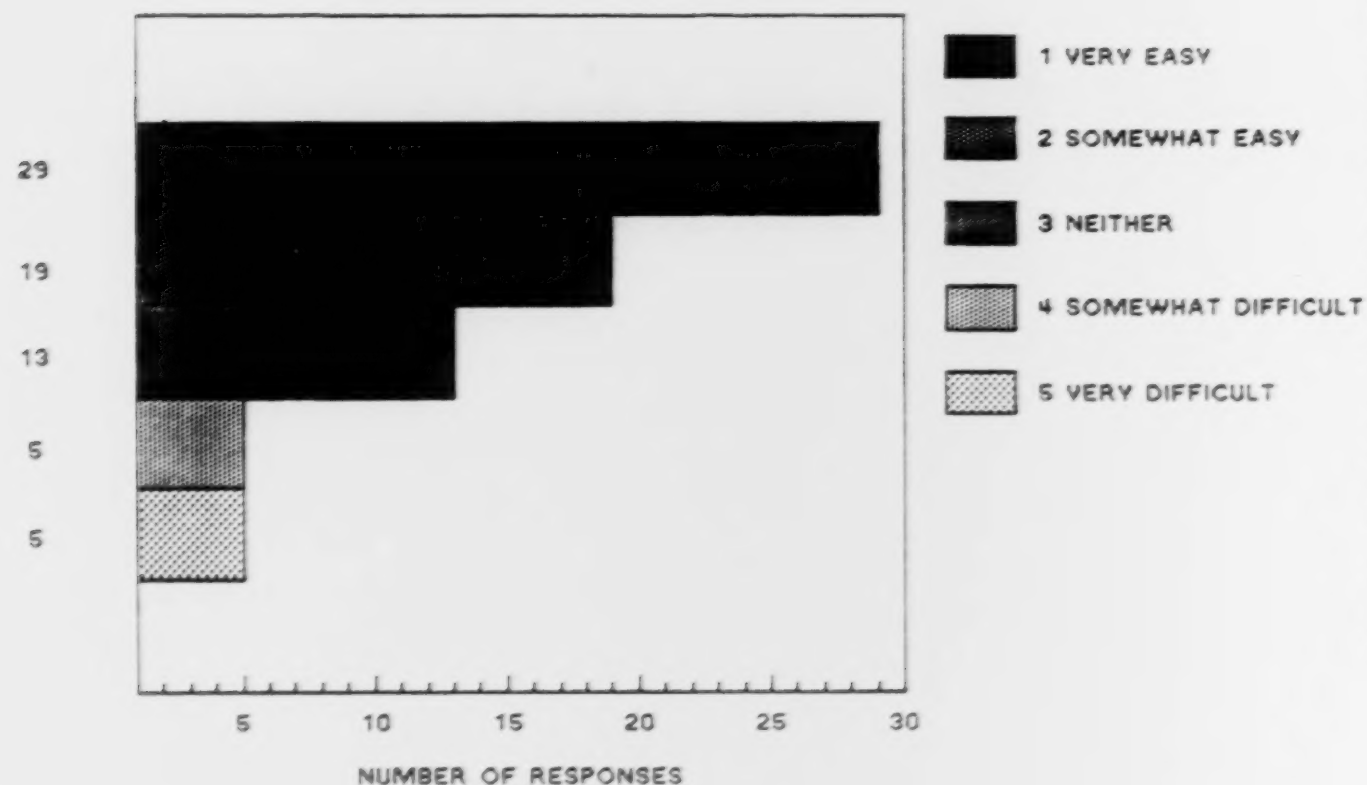


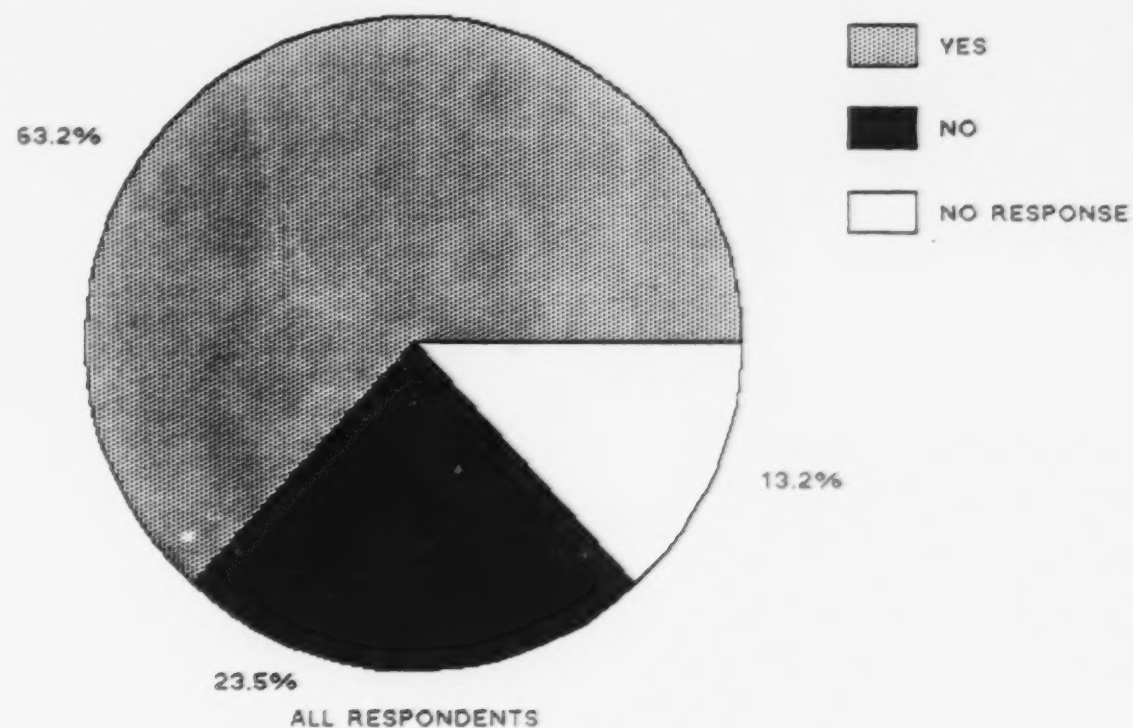
TABLE 2: CD-ROM PRODUCTS CHOSEN

WERE YOU SATISFIED WITH THE SEARCH (ALL CD-ROM PRODUCTS)



DID YOU RECEIVE ADEQUATE TRAINING ?

TABLE 4: DID YOU RECEIVE ADEQUATE TRAINING?



WAS THE MATERIAL ADEQUATE ?

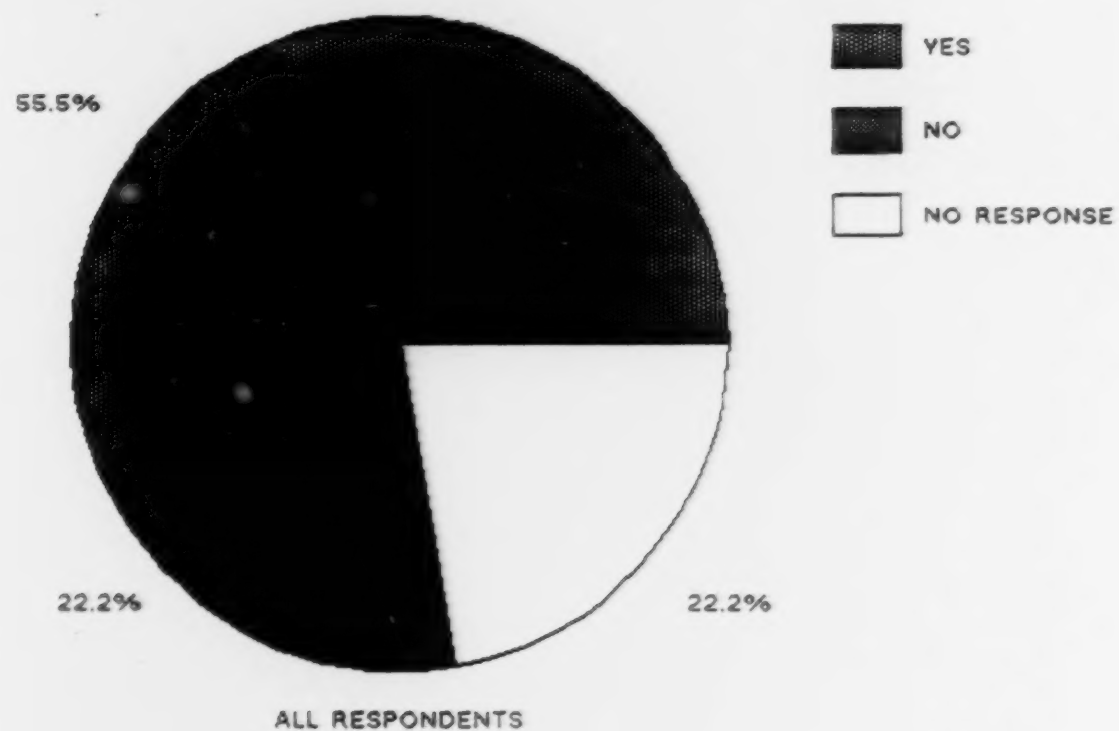


TABLE 5: WAS THE MATERIAL ADEQUATE?

PLAN TO USE THIS PRODUCT AGAIN ?

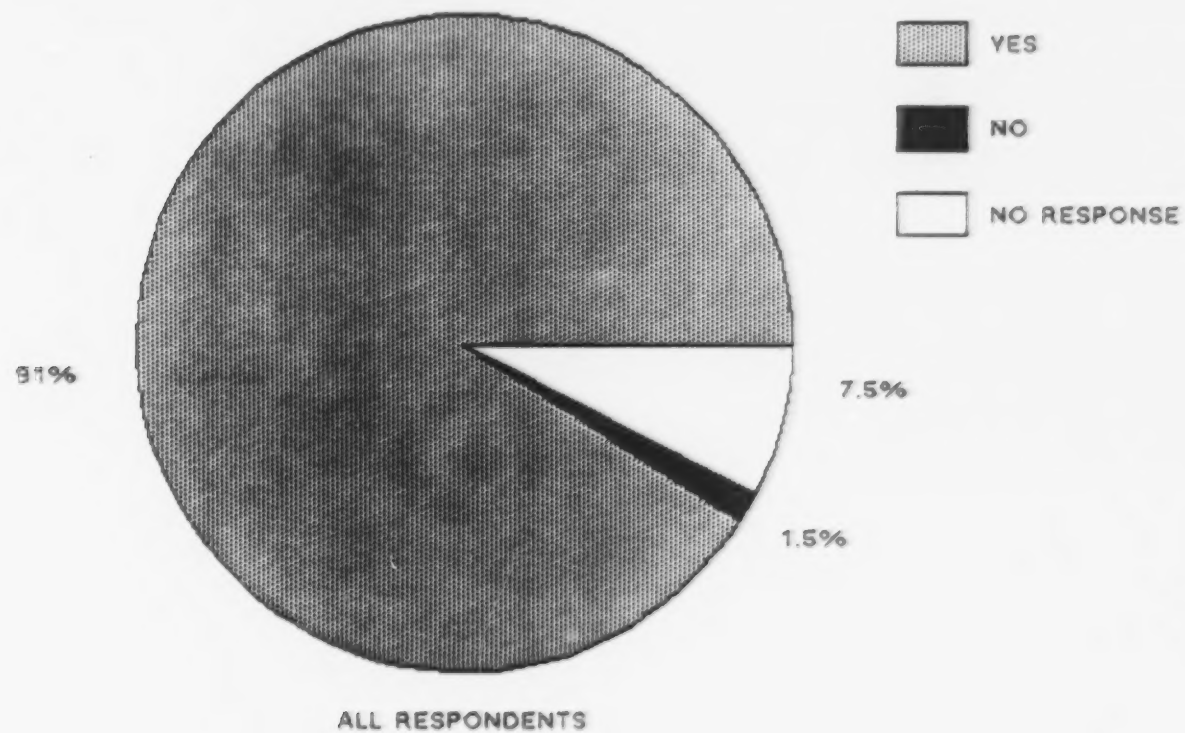


TABLE 6: PLANNED PRODUCT USE

EASE OF USE WITH CD-ROM PRODUCT BUSINESS PERIODICAL INDEX - BPI

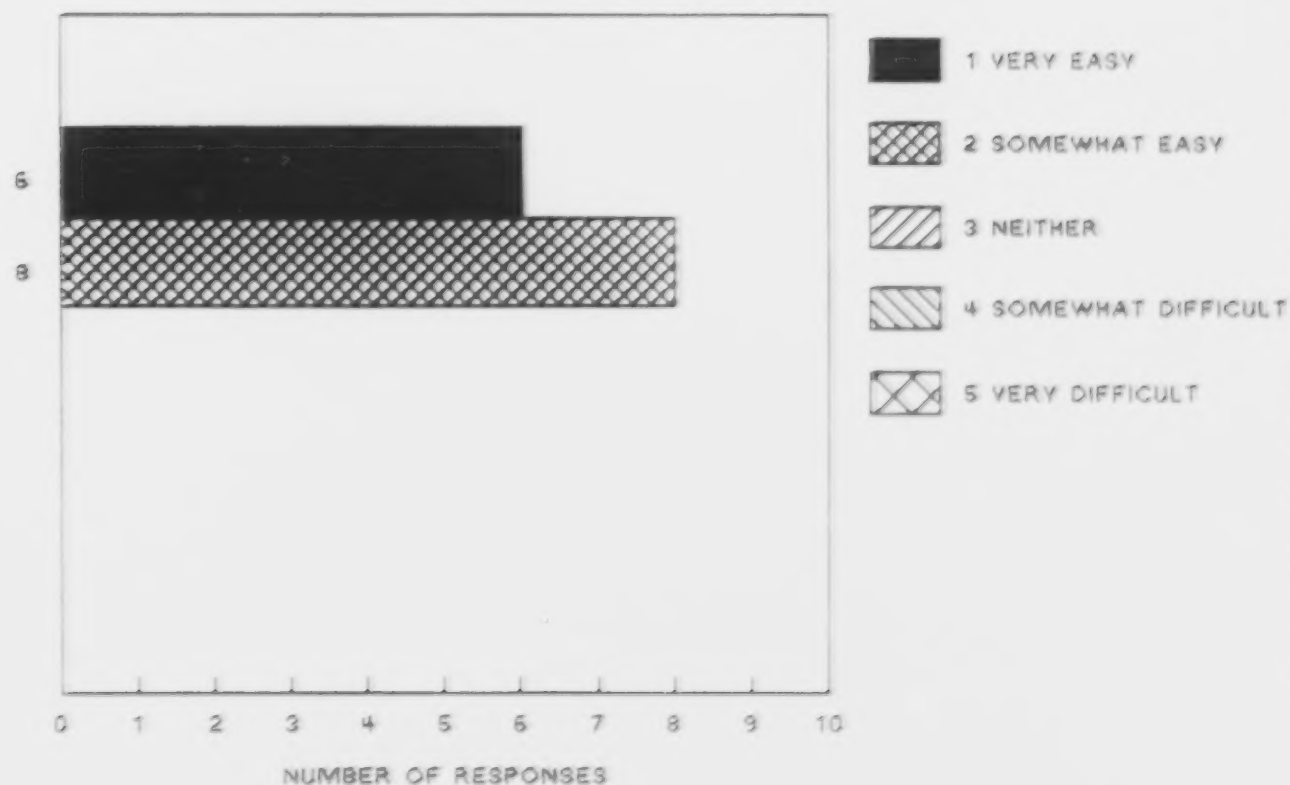
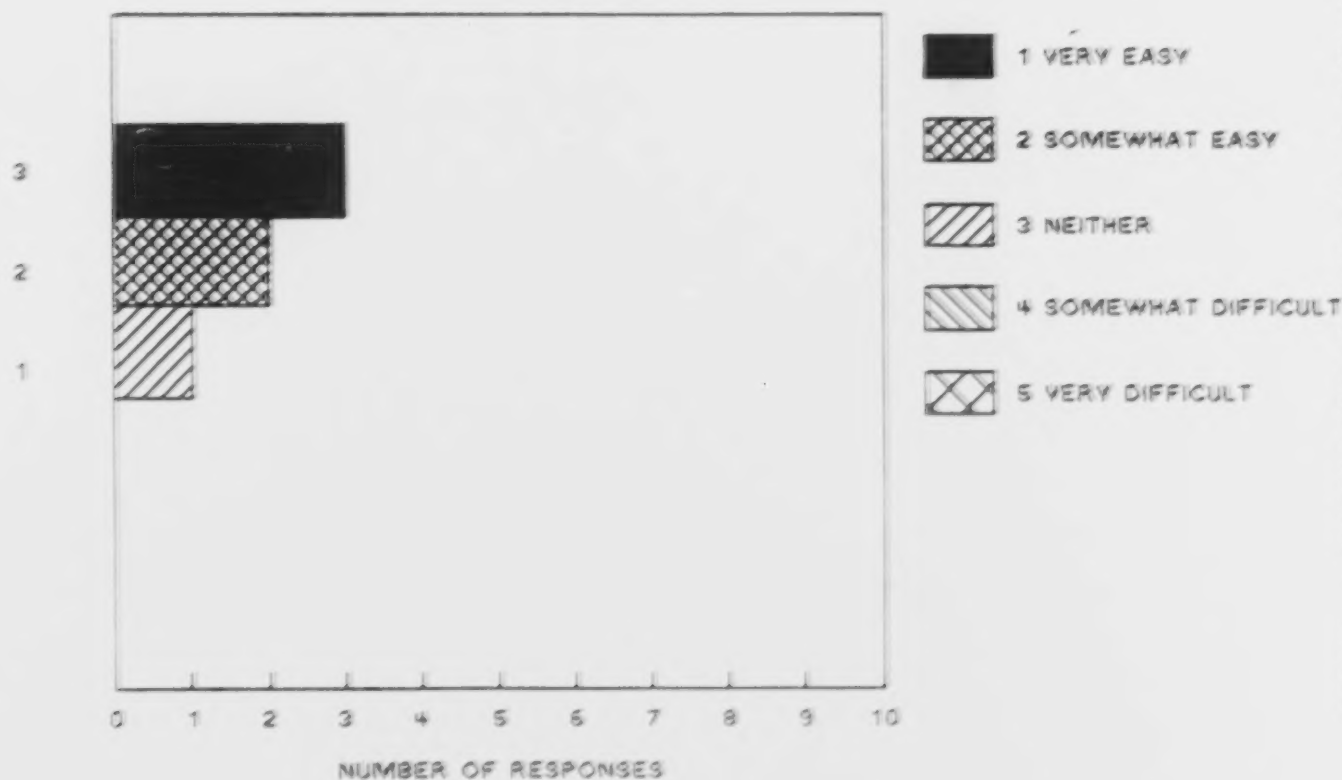


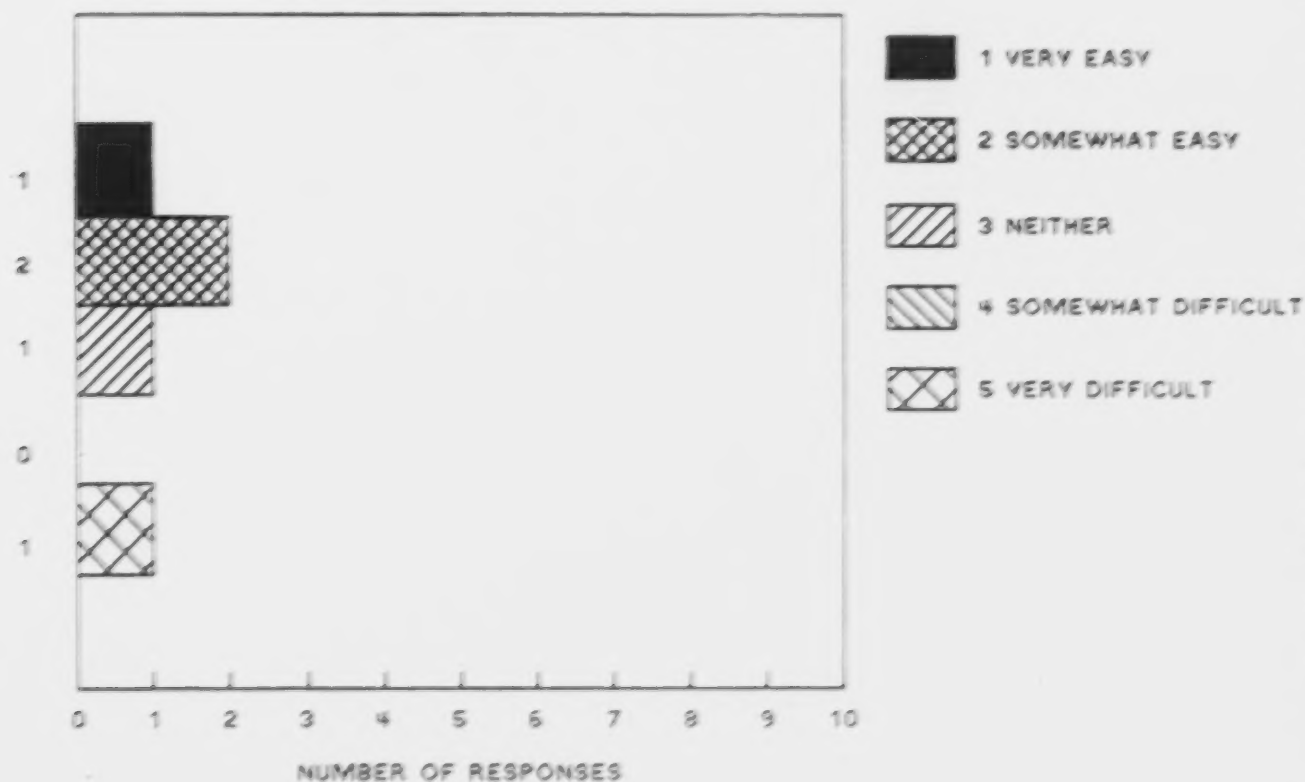
TABLE 7: EASE OF USE WITH CD-ROM PRODUCT - BPI

EASE OF USE WITH CD-ROM PRODUCT U.S. PATENT INDEX - CASSIS

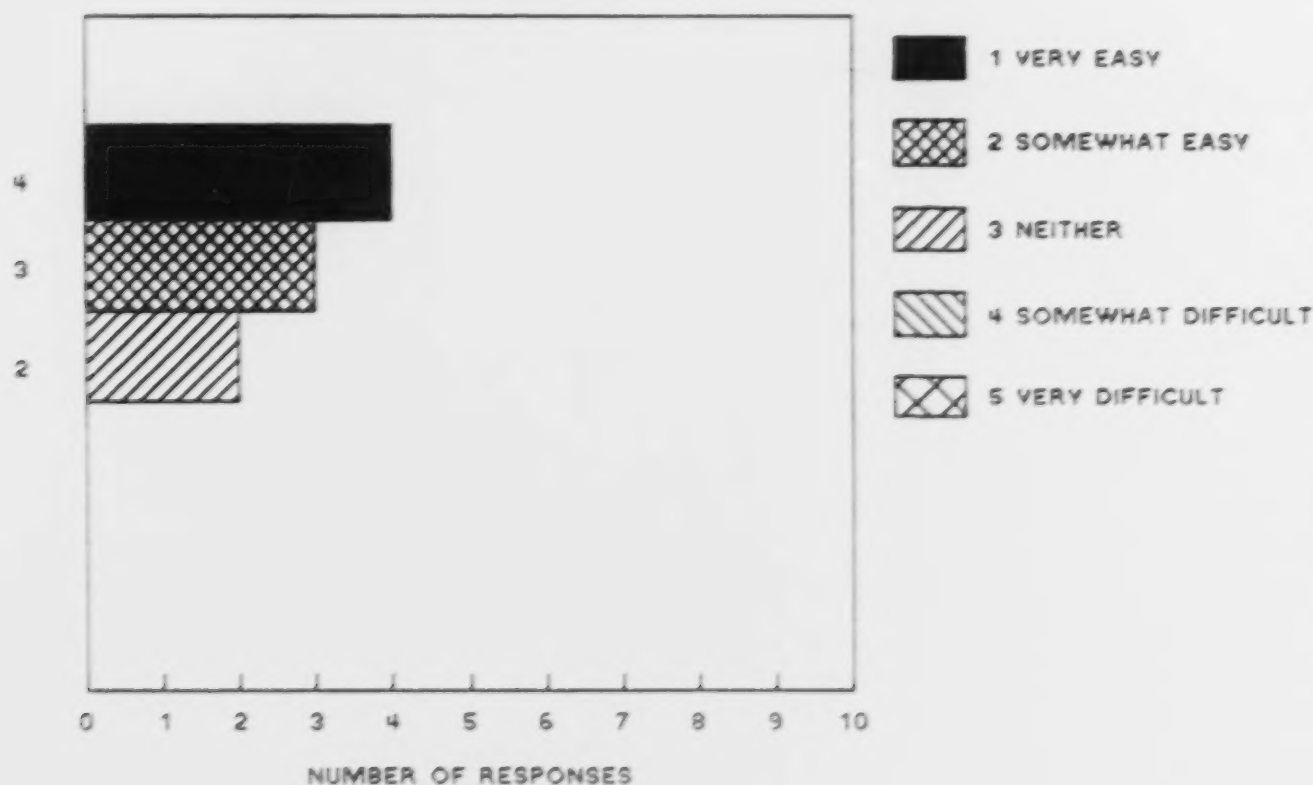


EASE OF USE WITH CD-ROM PRODUCT CORP & IND RESEARCH RPTS - CIRR

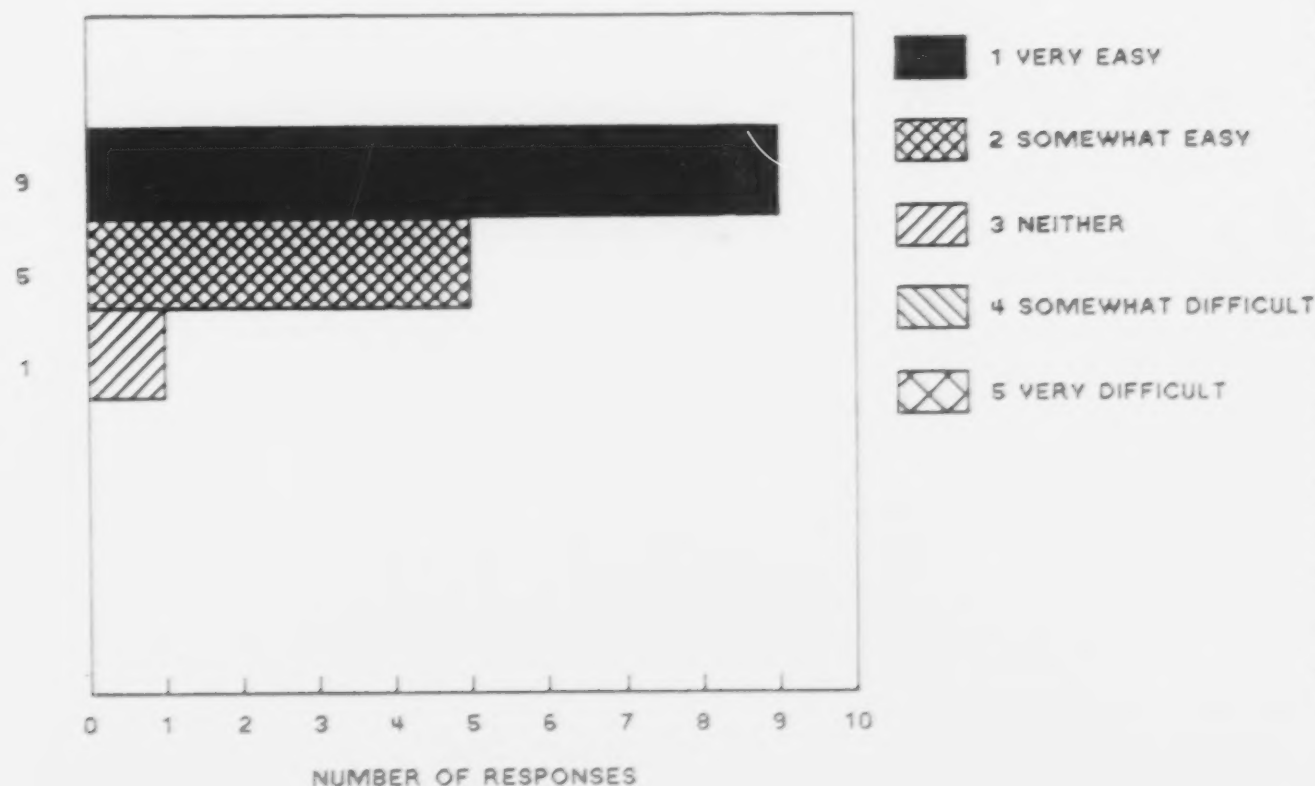
TABLE 9: EASE OF USE WITH CD-ROM PRODUCT - CIRR



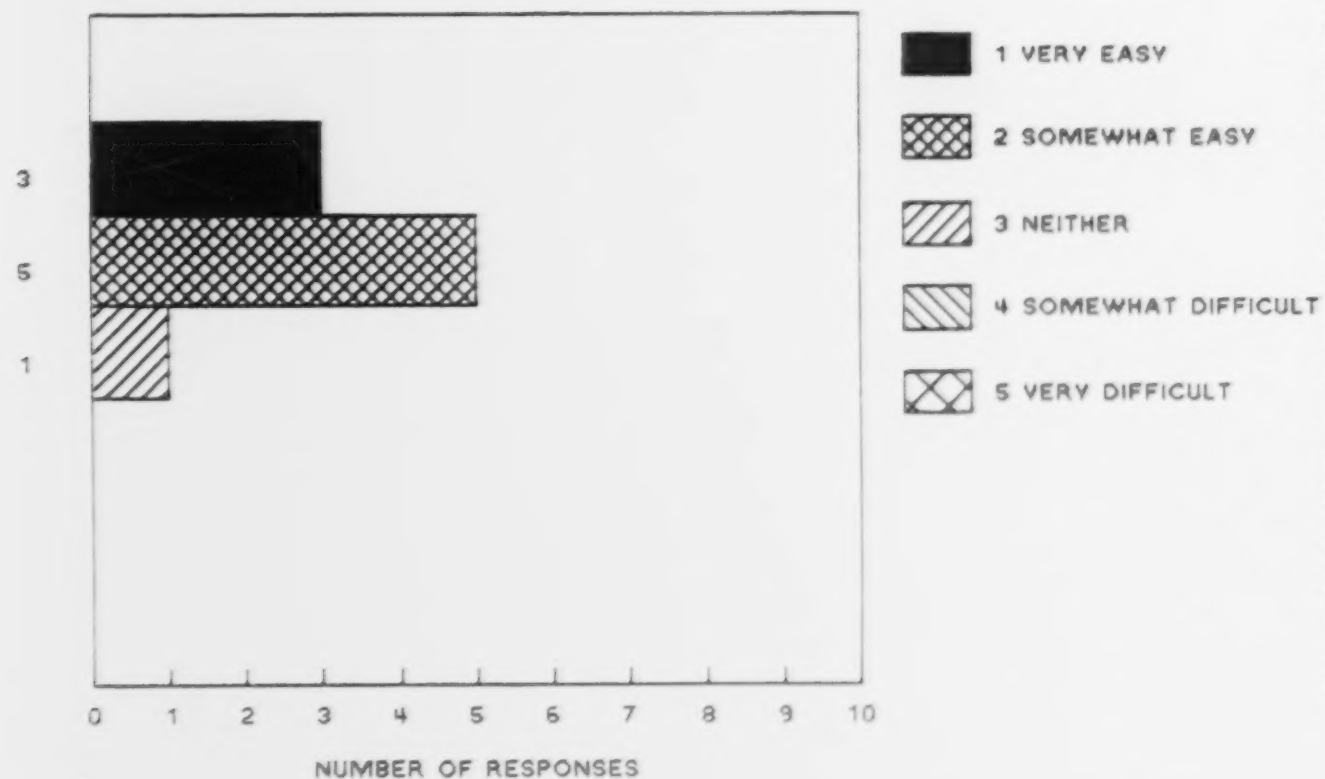
EASE OF USE WITH CD-ROM PRODUCT EDUCATIONAL RESOURCES - ERIC



EASE OF USE WITH CD-ROM PRODUCT GOVERNMENT PUBLICATIONS - GPO

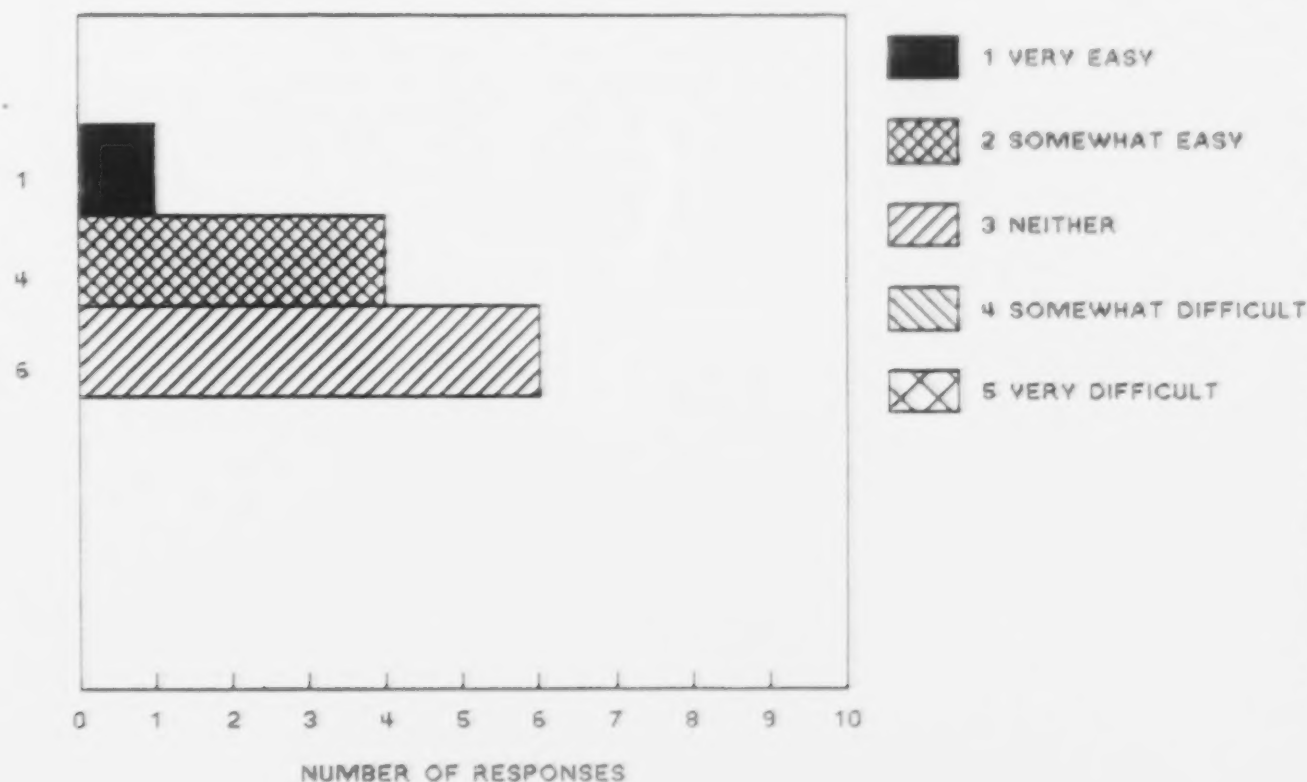


EASE OF USE WITH CD-ROM PRODUCT INDEX TO LEGAL PERIODICALS - ILP

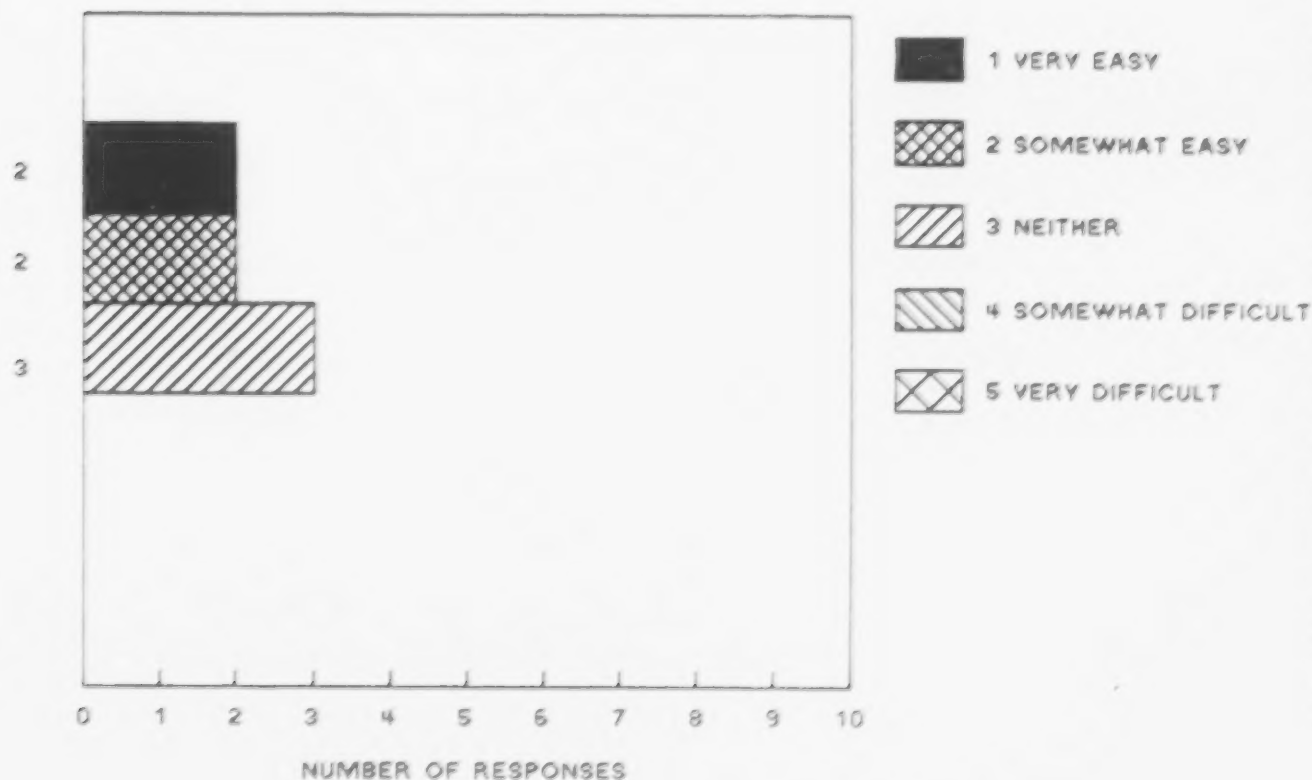


EASE OF USE WITH CD-ROM PRODUCT NATIONAL TECH INF SERVICE - NTIS

TABLE 13: EASE OF USE WITH CD-ROM PRODUCT - NTIS



EASE OF USE WITH CD-ROM PRODUCT MEDLINE - MED



CONCLUSIONS

Database access has been available through search intermediaries for some time now. Online services are now encouraging end users to search databases directly. In response to this, librarians are taking on new end-user training and support roles. In response to the trend toward end user systems, librarians are rethinking and redesigning their roles vis a vis online searching. Evidence presented throughout this paper has been discussed in the professional literature cited. This and the several studies prove and lead us to improve our understanding of the characteristics and experiences of end users. Librarians have also used the literature as a medium for reviewing and evaluating end user systems, demonstrating a new consumer advocacy role for the profession. CD-ROM is yet another informal medium for the storage and transfer of information.

This study suggests the following conclusions about the introduction and use of CD-ROM systems:

1. All eight of the CD-ROM systems are being used by patrons.
2. A little more than fifty percent of respondents felt training for the CD-ROM's from a manual was adequate.
3. Sixty-five percent of respondents felt training for the CD-ROM's from a librarian was adequate.

4. Satisfaction from CD-ROM use ranged from greatly satisfied to not very satisfied. (Forty-one percent were greatly satisfied; twenty-seven percent were very satisfied; eighteen percent were satisfied; seven percent were somewhat satisfied; seven percent were not very satisfied).
5. An overwhelming majority of respondents, ninety-eight percent will continue to use the CD-ROM systems.

CD-ROM's complement existing paper, microforms, and online sources with the libraries environment. The reference librarian's traditional role as information finder began to change with the advent of online systems. CD-ROM will place still more information finding power in user's hands. Users will need less help in finding information and more help in processing it. Is this a new role for a reference librarian? What new skills does it require? New communication media and information products, even when they are easy to use, are adapted first by the information haves rather than the have nots. The benefits of CD-ROM will not extend to most people unless awareness, trial, learning and use are stimulated by schools, libraries, business, and government. The New York State Library is taking a pro-active approach to assisting the patron's needs with electronic searching. An overwhelming ninety-eight percent of the respondents felt they would utilize the CD-ROM

searching system repeatedly! This study and the corresponding results will enable us to address some of the difficulties users are experiencing and make improvements over items that are in our control.

RECOMMENDATIONS

This study is one of the first sampling surveys conducted at the New York State Library in Albany to determine user reception of and satisfaction with CD-ROM products. In my research, I have observed that people really do need help with CD-ROM because the products vary so much. Based on the results of this survey, I make the following recommendations:

1. Provide appropriate overhead signage indicating the CD-ROM product and its function.
2. Provide CD-ROM "help" desk.
3. Provide adequate staff knowledge in CD-ROM products.
4. Provide user-friendly instructional materials such as command cards.
5. Generate increased usage of ERS through development and distribution of promotional materials.
6. Provide staff to review users' search strategies and suggest possible methods to retrieve a more specialized or comprehensive search.

RECOMMENDATIONS FOR FUTURE RESEARCH

Future research is needed to focus in on particular aspects of CD-ROM use not addressed or generalized in this study. Among these are CD-ROM use, satisfaction, training methods, and future needs. External factors to be taken into consideration could be CD-ROM product availability, training assistance, and/or technological updates since librarians' new roles will encompass end user training and support.

COMMENTS

Due to the structured questioning of the questionnaire, it was anticipated that respondents would want to alert us to questions or problems not asked.

Compiled below is a list of what respondents also felt:

- "Librarian who provided training was excellent."
- "Once a librarian explained the basics, I was able to proceed nicely."
- "Didn't know they were available for public to use."
- "This is a fantastic and easy product."
- "It's nice to see the libraries changing their tedious reputation."
- "Disadvantage is not allowing Boolean search."
- "At first it is confusing, the difference between a browse search and a Wilsearch."
- "Found the show to print a little confusing."
- "Should have a way to stop what you're doing, i.e. printing or going through items to start a new search --- key or instructions to abort search should be obvious."
- "Machine errors are the major problem."
- "I am going back to printed indexes. I don't think the indexing is adequate."
- "I'm not a computer jock and thought this was great."

- "I would like to know more about search storage techniques and how to thransfer them to 5½" floppy disks."
- "I really appreciate the service. Thanks!"

FOOTNOTES

- 1 Peter M. LePoer and Carol A. Mularski, "CD-ROM's Impact on Libraries and Users," The Laserdisk Professional July 1989: 40.
- 2 Ibid.: 42.
- 3 Ibid.: 43.
- 4 Ibid.: 43.
- 5 Ibid.: 44.
- 6 Anne S. Hudson, "CD-ROM Technology --- Its Impact on Libraries and Education," LITA Newsletter Issue 34: Vol. 9, Number 4, Fall 1988: 9.
- 7 Alice C. Littlejohn and Joan M. Porter, "Compact Disks in an Academic Library: Developing an Evaluation Methodology," The Laserdisk Professional May 1988: 36.
- 8 Ibid.: 37.
- 9 Romona J. Steffey and Nikki Meyer, "Evaluating User Success and Satisfaction With CD-ROM," The Laserdisk Professional September 1989: 35.
- 10 Ibid.: 37.
- 11 Ibid.: 38.
- 12 Ibid.: 38.
- 13 Ibid.: 38.
- 14 Ibid.: 42.
- 15 Joanne G. Marshall, "End User Training: Does it Make a Difference?" Medical Reference Service Quarterly Vol. 8, Number 3, Fall 1989: 15.
- 16 Ibid.: 16.

- 17 Ibid.: 19.
- 18 Bruce Connolly, "Information Delivery With a Wilsondisc Reference Workstation," The Laserdisk Professional July 1988: 28.
- 19 Ibid.: 33.
- 20 Ibid.: 35.
- 21 Bill Coons and Linda Stewart, "Mainstreaming CD-ROM into Library Operations," The Laserdisk Professional September 1988: 31.
- 22 Ibid.: 33.
- 23 Ibid.: 33.
- 24 Ibid.: 35.
- 25 Ibid.: 36.
- 26 Ibid.: 37.
- 27 Ibid.: 39.
- 28 William Paisley and Matilda Butler, "The First Wave: CD-ROM Adoption in Offices and Libraries: I," OCLC-Micro Vol. 4, Number 1, February 1988: 21.
- 29 Ibid.: 21.
- 30 Ibid.: 22.
- 31 William Paisley and Matilda Butler, "The First Wave: CD-ROM Adoption in Offices and Libraries: II," OCLC-Micro Vol. 4, Number 2, April 1988: 15.
- 32 Ibid.: 18.

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- Hainey, John M. "A Comparison of Different CD-ROM Local Area Networks in Universities." CD-ROM Enduser June 1989: 17-18, 20-22.
- Hudson, Anne. "CD-ROM Technology: Its Impact on Libraries and Education." LITA Newsletter Fall 1988: 8-13.
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- Paisley, William and Matilda Butler. "The First Wave: CD-ROM Adoption in Offices and Libraries: I." OCLC Micro February 1988: 19-23.
- Paisley, William and Matilda Butler. "The First Wave: CD-ROM Adoption in Offices and Libraries: II." OCLC Micro April 1988: 15-23.
- Marshall, Joanne. "End-user Training: Does it Make a Difference?" Medical Reference Services Quarterly Fall 1989: 15-27.
- Meyer, F. "Networked CD-ROM." Inform September 1988: 30.
- Starr, Karen J. "Taming the CD-ROM Wilderness: Developing and Managing a Workstation." The Laserdisk Professional November 1988: 46-52.
- Steffy, Ramona. "Evaluating User Success and Satisfaction With CD-ROM." The Laserdisk Professional September 1989: 35-45.
- Watson, Bradley and Jon Fawsey. "Relative Performance of Three CD-ROM Network Access Products." OCLC Micro August 1989: 20-21.

Your evaluation will help us decide what CD-ROM products to purchase or maintain and to improve our service to you. Thank you.

1. Which CD-ROM product did you use? Indicate by a check []

☐ BPI [Business Periodical Index]	☐ GPO [Government Publications]
☐ CASSIS [US Patent Index]	☐ ILP [Index to Legal Periodicals]
☐ CIRR [Corporate & Industry Research Reports]	☐ NTIS [National Technical Information Service]
☐ ERIC [Education Resource]	☐ MED [Medline]

2. How easy was this product to use? Circle number.

Very Easy

Very Difficult

1

2

3

4

5

3. Was the instructional material adequate? ☐ Y ☐ N

4. Do you feel you received adequate training from a librarian for you to use the CD-ROM product? ☐ Y ☐ None

5. Were you satisfied with the results of your search? Circle number.

Very Satisfied

Not very satisfied

1

2

3

4

5

6. Do you plan to use this product again? ☐ Y ☐ N

7. Comments: _____

PLACE EVALUATIONS IN BOX BY WORKSTATION
 THANK YOU

UPDATE OF CD-ROM PRODUCTS
IN THE NEW YORK STATE LIBRARY SINCE AUGUST 1989

ABI/INFORM (1985+) --- contains abstracts of articles for law, finance, taxation, human resources, and other areas related to business.

DODISS Plus (current) --- contains summaries of U.S. military standards and specifications.

Excerpta Medica (1988) --- provides citations covering a wide range of medical and biomedical subjects in various Excerpta Medica abstracting journals.

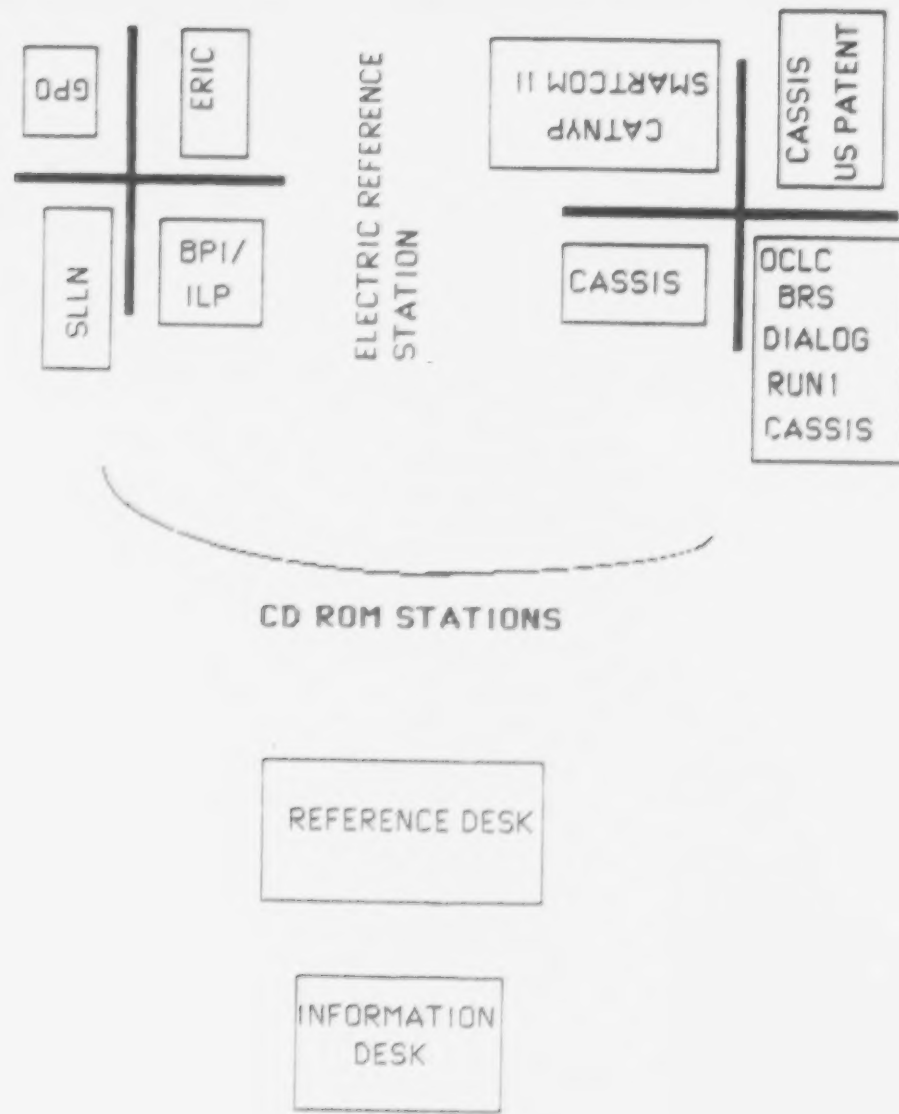
Legaltrac (1980+) --- provides citations to 500 law review journals.

Newspaper Abstracts (1985+) --- consists of abstracts and indexing to major U.S. newspapers.

PAIS --- provides citations to periodicals which cover aspects of business, economics, political science, and other areas of social science.

Periodicals Abstracts (1988+) --- consists of citations in journals of general interest.

Social Science Index (1983+) --- indexes 300 key international periodicals in the social sciences.



REFERENCE STATION DIAGRAM-AUGUST 1989
NEW YORK STATE LIBRARY AT ALBANY - 7TH FLOOR
FIGURE 1